Data sheet

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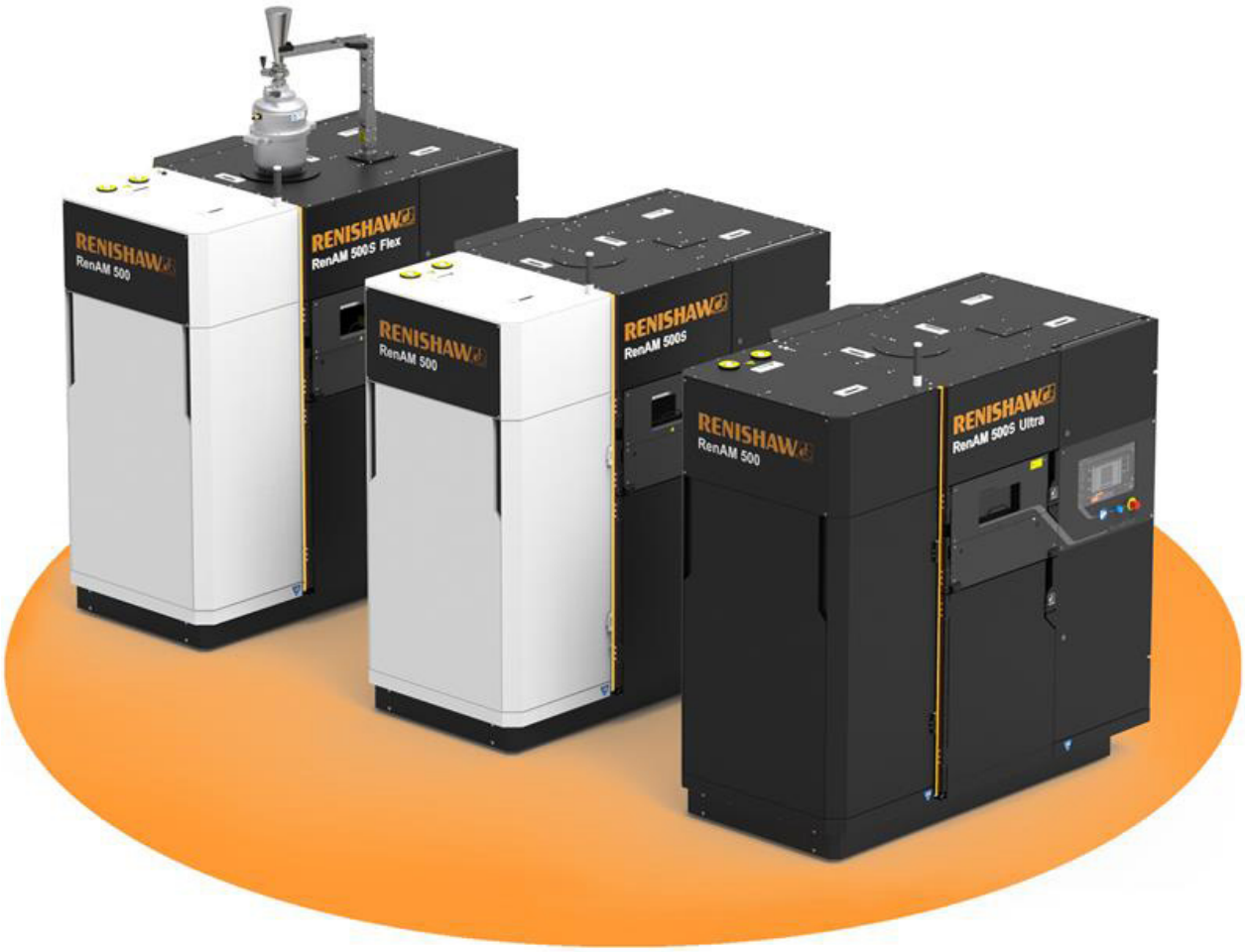
RenAM 500 series additive manufacturing systems



RenAM 500S Flex | RenAM 500S | RenAM 500S Ultra

RenAM 500D Flex | RenAM 500D | RenAM 500D Ultra

RenAM 500Q Flex | RenAM 500Q | RenAM 500Q Ultra

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System description

The RenAM 500 series is Renishaw's range of high-productivity laser powder bed fusion (LPBF) additive manufacturing (AM) systems. All versions of the RenAM 500 series feature a digital control system and a vacuum chamber for quickly preparing low-oxygen build atmospheres. The RenAM 500 series can be configured with one (500S), two (500D) or four (500Q) high-power 500 W lasers, each able to access the whole powder bed surface.

The RenAM 500 and RenAM 500 Ultra systems feature automated powder and waste handling systems that automatically sieve and cycle powder back into the machine without user intervention. The RenAM 500 Flex systems feature a total loss powder management system designed for external sieving, which allows for greater flexibility when it comes to powder choice.

RenAM 500 Ultra systems come equipped with additional features designed to maximise laser-on time during a build, allowing for even faster production rates. As standard, RenAM 500 Ultra systems have Renishaw's TEMPUS™ technology installed – an innovation that synchronises the lasers with the powder recoater to reduce build times by up to 50%.

Renishaw's latest process monitoring tools are also included as standard for RenAM 500 Ultra systems. These tools provide live feedback on powder dosing, laser energy input and melt-pool characteristics, which can be analysed to monitor build quality and reduce post-build inspection costs. The process monitoring tools packaged with RenAM 500 Ultra systems include:

- LaserVIEW hardware module
- MeltVIEW hardware module
- CameraVIEW hardware module
- 12-month licence for InfiniAM Camera software
- 12-month licence for InfiniAM Spectral software
- Renishaw Central AM connector.

Model configurations

Model	Number of lasers	Powder recirculation	CameraVIEW	LaserVIEW and MeltVIEW	TEMPUS technology	RBV and OSV compatible **
RenAM 500S Flex	1	*	✓	*	*	✓
RenAM 500S	1	✓	✓	*	*	✓
RenAM 500S Ultra	1	✓	✓	✓	✓	✓
RenAM 500D Flex	2	*	✓	*	*	✓
RenAM 500D	2	✓	✓	*	*	✓
RenAM 500D Ultra	2	✓	✓	✓	✓	✓
RenAM 500Q Flex	4	*	✓	*	*	✓
RenAM 500Q	4	✓	✓	*	*	✓
RenAM 500Q Ultra	4	✓	✓	✓	✓	✓

* Model can be upgraded to support this technology post-purchase.

** The Reduced Build Volume (RBV) and Optical System Verification (OSV) kits are optional ancillaries designed for the RenAM 500 series systems that enhance thier capabilities. Contact Renishaw for further information.

Safety certifications

Specifications

Processable materials		Metals in powder form. Examples include stainless and tool steels, aluminium alloys, nickel-based alloys and titanium alloys. For further material information and surface finishes, visit **www.renishaw.com/msds**		
Mass (net)		**S (single laser)**	**D (dual laser)**	**Q (quad laser)**
	RenAM 500 Flex	1,870 kg (4,122 lb)	1,900 kg (4,189 lb)	1,960 kg (4,321 lb)
	RenAM 500	1,950 kg (4,300 lb)	1,980 kg (4,365 lb)	2,040 kg (4,498 lb)
	RenAM 500 Ultra	1,970 kg (4,343 lb)	2,010 kg (4,416 lb)	2,070 kg (4,564 lb)
Dimensions		**Length**	**Width**	**Height**
	RenAM 500 Flex	2,165 mm (86 in)	1,236 mm (49 in)	2,794 mm (110 in)
	RenAM 500	2,165 mm (86 in)	1,236 mm (49 in)	2,130 mm (84 in)
	RenAM 500 Ultra	2,165 mm (86 in)	1,236 mm (49 in)	2,130 mm (84 in)
Laser properties		**S (single laser)**	**D (dual laser)**	**Q (quad laser)**
	Laser power	1 × 500 W	2 × 500 W	4 × 500 W
	Type of laser	Ytterbium fibre	Ytterbium fibre	Ytterbium fibre
Build volume [1]		250 mm × 250 mm × 350 mm (9.8 in × 9.8 in × 13.8 in)		
Powder layer thickness		20 µm to 120 µm		
Build rate [2]		Up to 254 cm^3/h (15.5 in^3/h)		
Typical processing speed [3]		2 m/s (6.6 ft/s) (maximum 10 m/s (32.8 ft/s))		
Beam focus diameter		80 µm (3×10^{-3} in) with dynamic focus		
Dynamic focus diameter		Up to 500 µm (20×10^{-3} in)		
Beam wavelength		1,070 nm to 1,080 nm		
Laser modulation frequency (maximum)		20 kHz		
Time to prepare build chamber atmosphere		15 minutes (to < 1,000 ppm oxygen)		
System fill/purge consumption		< 1,200 L (43 ft^3)		
Maximum argon consumption (during fill)		400 L/min (14.12 ft^3/min)		
Running argon consumption (after initial fill)		< 0.8 L/min (1.8 ft^3/h)		
Working pressure in chamber		10 mbar-gauge to 20 mbar-gauge		
Argon gas supply connection		3/8 in BSP male cone fitting		
Argon quality		20 ppm permissable impurities or better (99.998% pure)		
Power supply [4]		380 V to 480 V AC, 63 A, 50 Hz to 60 Hz, 3-phase		
Data connections [5]		Standard network connection RJ45. Renishaw recommends using Cat6 cabling.		
Chilled water connection [6]		Connection hose is 19 mm (internal diameter) and 26 mm (external diameter). Compatible with water-air and water-water chillers, available from Renishaw.		
Ideal operating temperature [7]		18 °C to 22 °C (64 °F to 72 °F) Minimum/maximum: 15 °C to 28 °C (60 °F to 82 °F)		
Ideal relative humidity [7]		< 60% (maximum < 80%)		
Clearance under machine (no plinth)		146 mm (5.75 in)		
Optical module sealing		IP5X		
Noise level		≤ 70 dB		
Compatible software		QuantAM, InfiniAM Camera, InfiniAM Spectral, Renishaw Central and select third-party providers		

1 Build volume refers to the maximum wall-to-wall build volume, but builds will typically be smaller. Dimensions do not include build plate.

2 Maximum build rate does not include recoater time and is dependent upon parameters, part geometry and material.

3 Typical processing speed is dependent upon parameters, part geometry and material.

4 Maximum calculated load of machine is 50 A, nominal operating current is 32 A.

5 The user has the option to configure the network using their own control software. Refer to the *RenAM 500 series additive manufacturing system* user guide, Renishaw part no. H-5800-3693, for more information.

6 Due to differences in electrical requirements across countries, the part numbers of ancillary equipment may vary. Consult your local service department if you have questions in this regard.

7 Temperature and humidity must not be at their stated maximum at the same time, and must remain below the level where the dew point approaches 16 °C (61 °F) to avoid condensation forming on the laser components. Refer to the RenAM 500 series additive manufacturing system Site preparation and Installation guide, Renishaw part no. H-5800-3692.

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